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TOWARDS A THEORETICAL FRAMEWORK FOR ORGANIZATIONAL INNOVATION

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Abstract

Being able to innovate has become a critical capability for many contemporary organizations in an effort to sustain their operations in the long run. However, existing innovation models that attempt to guide organizations emphasize different aspects of innovation (e.g., products, services or business models), different stages of innovation (e.g., ideation, implementation or operation) or different skills (e.g., development or crowdsourcing) that are necessary to innovate, in turn creating isolated pockets of understanding about different aspects of innovation. In order to yield more predictable innovation outcomes organizations need to understand what exactly they need to focus on, what capabilities they need to have and what is necessary in order to take an idea to market. This paper aims at constructing a framework for innovation that contributes to this understanding. We will focus on a number of different stages in the innovation process and highlight different types and levels of organizational, technological, individual and process capabilities required to manage the organizational innovation process. Our work offers a comprehensive conceptualization of innovation as a multi-level process model, and provides a range of implications for further empirical and theoretical examination.

Keywords: Innovation, capabilities, framework, process model, resource-based view.

1 INTRODUCTION

Innovation is one of the driving forces for redistributing wealth in free markets. While innovation is not necessarily linked to information technology, it is well-established that successful technology innovation can lead to new businesses, can change existing businesses through the introduction of new business models (Chesbrough, 2010), products or services or can change internal procedures and culture to yield higher degrees of efficiency. Clearly, innovative information technology solutions drive organizational change (Markus & Robey, 1988). In fact, new products and services can be as successful to as to create entirely new markets (Berry et al., 2006). Conversely, a lack of successful innovation can lead to bankruptcy of established businesses (Lucas Jr. & Goh, 2009), more and fiercer competition for established businesses by later market entrants that copy existing models, products or solutions, or, in the best case a stagnant business.

In the innovation literature, there is a growing awareness for the need to innovate in contemporary organizations (Nagji & Tuff, 2012). Approaches range from (not mutually exclusive) innovation projects conducted in facilities that aren't co-located with corporate headquarters or other corporate offices (Anthony, 2012), over open innovation with customers or other stakeholders (Chesbrough, 2003; Berry et al., 2006), to organizations primarily focussing on mergers and acquisitions to source innovative new products, services or business models. On the other hand, there are numerous examples of case studies of failed innovation (Lucas Jr. & Goh, 2009) and attempts to examine the tensions between technology innovations and the institutionalized practices prior to that innovation (Tushman & Anderson, 1986; Hargadon & Douglas, 2001).

There are different types of innovation (Nagji & Tuff, 2012), but there is no single theory available explaining innovation (Birkinshaw et al., 2011). Key decision makers still struggle to identify let alone direct the different pathways to successful innovation. Moreover, yielding predictable results from innovation activities is hard. Unsuccessful innovation, on the other hand, has its place too. Organizations need to learn to fail, learn how to fail fast and learn from their failures in order to embrace an innovation culture and strategy, all of which are capabilities largely absent in contemporary organizations (Edmondson, 2011) and very hard to build (Baumard & Starbuck, 2005).

Solutions to a lack of innovation need to address various aspects of primarily cultural and strategic nature at an organization's executive and board level (Leavy, 2005), characterizing innovation as an essential multi-level problem involving essential linkages between different individual and organizational levels (Goodman, 2000). Once an organization has established a strategic framework and defined desirable values and beliefs it wishes to embrace, processes, skills and capabilities need to ensure proper execution across levels of management, processes, infrastructure and individuals.

Our research aim is to contribute a framework that will identify organizational, individual, technological and process capabilities that are necessary throughout the various stages of an organizational innovation process. Using the framework, organizations will be able to identify exactly which capabilities are missing in order to innovate. For IS scholars, our framework draws attention to the role and relationships of technology capabilities in the organizational innovation process.

Our framework is in essence a multi-level process model of innovation, i.e. a process theory and not a variance theory (Poole et al., 2000). Perusing Markus and Robey's (1988) theory structure grid, our model describes the innovation *process* at the *macro level* as the *emergent perspective* of the causal agency between technology, process, individual and organizational capabilities. The model also describes one of the few attempts that we are aware of to construct a multi-level model encouraging multi-level research (Goodman, 2000). This approach allows us to overcome isolated models of individual/managerial (e.g., Menon & Pfeffer, 2003) or strategic/operational innovation decisions (e.g., Chesbrough, 2010) and instead offering a comprehensive model that draws attention to cross-level inter-relationships. Finally, our framework offers a novel conceptualization and a set of conjectures and propositions that can guide further theoretical and empirical research on IT-driven innovation and the role of technology capabilities to enable this process. Amongst others, further research will be able to build upon the framework by defining comprehensive measures for assessing

an organization's ability to innovate, and in turn test hypotheses about the relative contributions of the different capabilities involved in an innovation process.

2 BACKGROUND

2.1 Innovation and Innovation Processes in the Literature

Whilst innovation has historically provided firms with a major source of competitive advantage and prosperity (Porter, 2008), organisations must, against a background of increasing marketplace unpredictability and dynamism, look towards innovation as a means of survival (Poot et al., 2009). Examples of companies that failed to counteract disruptive technological and societal changes through innovation over the past few years are abound (e.g., Lucas Jr. & Goh, 2009).

Outside the dichotomies of survival and demise, innovative firms tend to experience more rapid growth rates and higher profit margins (van der Panne et al., 2003) compared to non-innovative organizations. Still, to harvest the profitable ramifications of innovations and to avoid losses due to failed innovation implementations or development efforts (Wind & Mahajan, 1988), the innovation process must be well understood, formally documented and embedded into the organisation and, above all else, effectively monitored and managed (e.g., van der Panne et al., 2003; Birkinshaw et al., 2008). Although this is by no means a simple or quick task, engaging in such rigour allows organisations to continuously improve the process of innovation and it is this effective process of innovation management that serves to provide organisations with significant competitive advantage that is extremely difficult for competitors to imitate (Bucic & Ngo, 2011). Consequently, as organisations improve their innovation capabilities and management practices over time, the same notions can be used to continuously improve and innovate the very process of innovation, inevitably leading to greater likelihood of thriving and prospering in turbulent environments (Birkinshaw et al., 2008).

An array of innovation process models are presented in the literature (e.g., Tornatzky & Klein, 1982; van der Panne et al., 2003; Berry et al., 2006; Nagji & Tuff, 2012), each with their own distinct advantages and disadvantages. In the interest of space we do not review these models in detail here but instead offer the following observations about key common attributes of these models:

1. Most innovation process models entail a similar pattern of steps or stages: (a) idea generation and identification; (b) concept development; (c) concept evaluation and selection; (d) development; and (e) implementation.
2. Innovation drivers can stem from market pulls, technology pushes, or a combination of both.
3. More recent models distinguish internal from open innovations, and thus constitute network or ecosystem models in which innovation is focused internally as well as externally.
4. Current models either operate on an organizational perspective (e.g., Du et al., 2007; Nagji & Tuff, 2012) or on an individual-level perspective (e.g., Menon & Pfeffer, 2003) in isolation.

2.2 Theoretical Frame

Our work considers a capability perspective on the organizational innovation process. Capabilities originate from a resource-based view of the firm (Wade & Hulland, 2004) and are defined as a special type of resource, specifically an organizationally embedded non-transferable firm-specific resource whose purpose is to improve the productivity of the other resources a firm can leverage (Makadok, 2001). The resource-based view is applicable in our context because past empirical research has established that firms possess resources, which enable them to achieve superior long-term performance (Mahoney & Pandian, 1992). In that view, innovation capabilities are a subset of firm resources that contribute to achieve innovation performance, i.e., success (Lawson & Samson, 2001).

The essential argument of the capability perspective as a key resource of the firm is that it provides an understanding of not only physical or other tangible assets (such as infrastructure, technology or human resources) but also non-transferable resources and processes that allow an organization to

achieve superior performance compared to competitors. Hence, it helps to gain sustainable competitive advantage. Recent work has distinguished such capabilities into operational and dynamic capabilities, with the former describing competences pertaining to the current operation of a business and the latter describing the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments (Teece, 2009).

Innovation capabilities (Lawson & Samson, 2001) are a form of dynamic capabilities that describe an organization's or individual's ability to continuously transform knowledge and ideas into new products, processes and systems for the benefit of the firm and its stakeholders. Importantly, different types of innovation capabilities can be defined and the construct can be applied to different levels of organizational analysis, in turn offering a fertile theoretical lens to develop a multi-level model of the innovation process in IT-enabled firms, which is the basis for our conceptualization below.

In constructing our model, we sought to develop a process logic in our theory (Markus & Robey, 1988; Poole et al., 2000); that is, to describe a model that allows scholars to examine process data in terms of relevant *events* that occur during an organization's attempt to innovate (e.g., an idea was borne, a technological disruption was identified, a product was launched), to consider data on *multiple units and levels of analysis* (e.g., activities within the R&D department, the decisions by an innovation or product manager, and the organizational response to market disruptions) and data about *occurrences and trends over time* (e.g., the product development project, the shakedown phase, the evolution of resistance to change) (Langley, 1999). The model described below adheres to these strategies for theorizing about process data by perusing the lens of innovation capabilities (Lawson & Samson, 2001) that allows scholars to focus on events that describe when such capabilities are required, identified, developed or utilized, and by identifying different capabilities operating on different units and levels of analysis (e.g. individual versus organizational), and explicitly considering capabilities about the temporal and logical execution of practices (viz., process capabilities).

3 A PROCESS MODEL FOR THE MANAGEMENT OF IT-ENABLED INNOVATION

3.1 Overview

From our literature review and various conceptualizations of the different phases of the innovation process we identified the four distinct stages of *ideation*, *incubation*, *implementation* and *operation*. Ideation refers to creating, sourcing or deriving ideas for new products, services or business models (Flynn et al., 2003). The number of ideas is potentially high at this stage. Whereas it is possible to influence the quality of ideas (Selart & Johansen, 2011), they are not yet validated from a business or technical feasibility perspective. Incubation uses these ideas as an input. It is the process of building up an understanding of how an idea can be turned into a value generator, i.e., a source of additional revenues, increased sustainability, saved cost or others. If an idea refers to a new product or service, this stage will deal with developing a business case and a prototype if applicable. The outcome of the incubation stage is an idea validated from a number of perspectives, often including business, technical and legal. These validated ideas are in turn input for the implementation stage. During implementation a product or service is built in a scalable way according to guidelines defined within an organization (e.g., marketing, architectural guidelines or business model considerations) and beyond (e.g., legal frameworks to adhere to, stakeholder considerations or cultural parameters). The implementation process hence creates new value generators such as products, services, or business processes that are used as an input into the final stage of the innovation process, operation. This stage will deal with market entry, production, sales and maintenance of a new product or service, with the execution or a new process or with applying a new business model. Figure 1 provides an overview of the main stages of the innovation process and the related main challenges in terms of leading questions organizations are faced with.

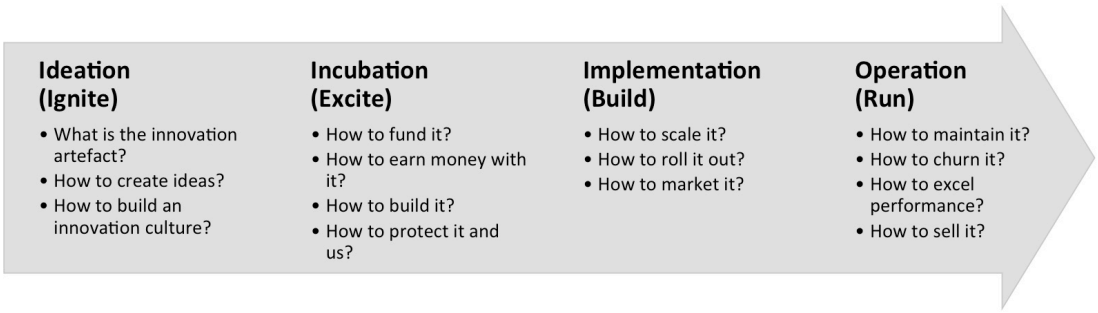

Figure 1. Overview of the Organizational Innovation Process and Relevant Leading Questions

In order to develop the skills required to execute the innovation process, the necessary organizational, individual, technical and process capabilities must be identified for each stage of the innovation process. For instance, innovative organizations need to develop the ability to produce lots of ideas and fail as fast with them as possible (Daly et al., 2012). Failures can occur in each stage of the innovation process. Examples for why innovation artefacts might fail and should be let failing include that they are economically unfeasible in terms of expected revenues, prohibitively expensive to build or run, bound to legal challenges that are too difficult to overcome, cannot be scaled, or cannot be maintained.

Our framework attempts to identify and categorize the required capabilities to provide all skills relevant to the innovation process. *Figure **2*** provides a conceptual model of our innovation process framework on the basis of the identified four stages and relating them to required capabilities on an organizational, technological, process and individual level.

We are specifically interested in the sets of capabilities that are tied to a number of questions comprehensively covering innovation as a phenomenon from the organizational macro level our theoretical framework purports to address:

- Why does innovation occur?
- Who within the organization drives innovation?
- How are the main actors supported in their innovation efforts?
- What are the boundary conditions within which innovation occurs within organizations?

In order to address the first question, why innovation occurs in organizations, we consider *organizational capabilities*. These capabilities will determine if an organization is in general set up to foster innovation or whether it is capable to create an innovation culture. For example, scholars have argued the existence of an organizational mindfulness capability that can predict how the organization can innovate with information technology (Swanson & Ramiller, 2004). The second question, who is driving innovation, can best be addressed by understanding the set of *individual capabilities* that innovation agents within an organizations possess or do not possess. For example, past studies have shown that managers can have different preferences for external knowledge exploitation (Menon & Pfeffer, 2003), which can either foster or inhibit the innovation process. In term of organizational support for innovation efforts, we look specifically into technological capabilities as enablers, or the lack thereof as inhibitors. For example, social networking technologies are said to provide functional affordances around relational ties and knowledge exchange (Boyd & Ellison, 2007) that can support employee communication, collaboration and idea exchange and thereby support innovation – if perused within the right emotional and organizational mindset (Huy & Shipilov, 2012). And finally, a set of process capabilities will provide us with a better understanding of relevant boundary conditions as we will argue that innovation processes are longer in duration and more complex in nature than other operational processes (Teece, 2009).

These four dimensions thus capture the dichotomies of individual vs. organizational capabilities as actors or driving force behind innovation as well as technological vs. process capabilities as enablers or inhibitors of innovation.

The main conjecture of our framework is that for the successful traversal of the stages of the innovation process, organizations need to develop and execute capabilities across all four organizational levels. We go on to detail each factor and level of the framework in the subsections below.

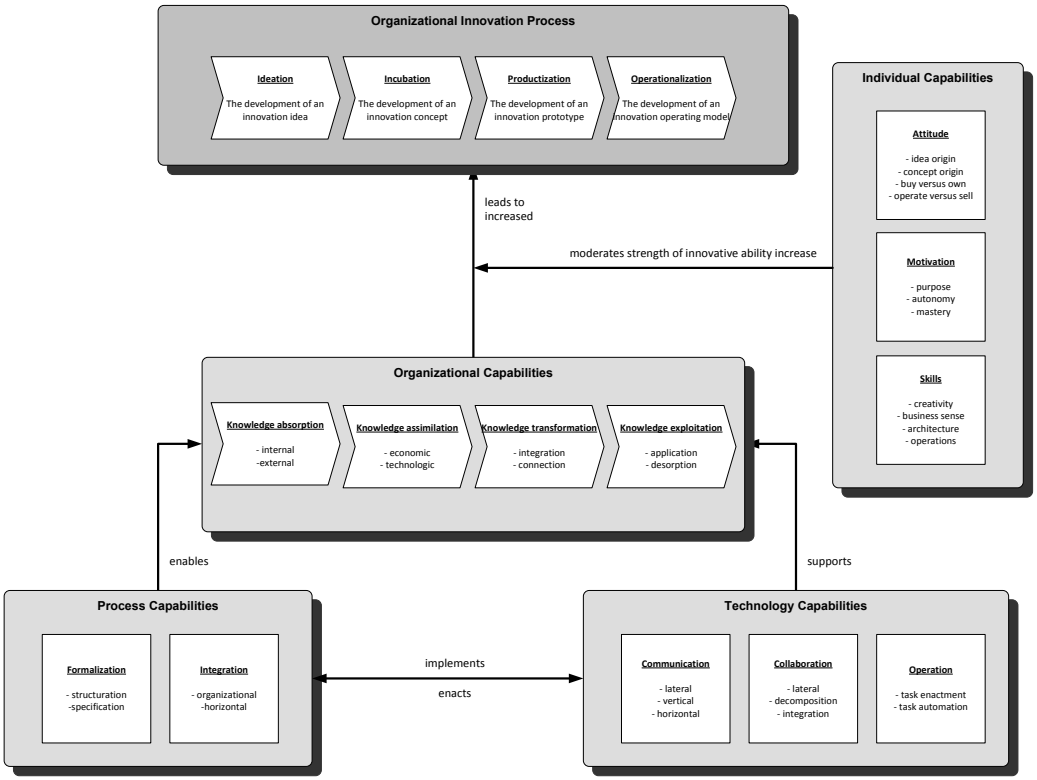

Figure 2. Conceptual Model of the Innovation Process and Required Capabilities

3.2 Organizational Capabilities

The first distinct set of capabilities for successful innovation pertains to the organization in which innovation is to occur.

During the ideation phase of the innovation process an organization needs to build capabilities in *knowledge absorption*. Internally to an organization this translates into *inventive capacity*, the ability to explore knowledge inside the organization. Since knowledge resides in different parts of an organization and associated individuals this capability refers building capability to enable free flow of this knowledge. Externally to an organization knowledge absorption refers to *acquisition capacity*, or the ability to identify and obtain knowledge from external sources.

In the next phase, incubation, an organization needs to build capabilities in *knowledge assimilation*. There are different areas of assimilation. We will focus on three distinct and major ones, *economic*, *technical* and *legal* knowledge. Economic knowledge assimilation includes the ability to understand the business impact of an innovation artefact. In most cases these will manifest through a business model (Osterwalder, 2010) as well as a business case (why would an organization invest in a specific innovation artefact?). Technical knowledge assimilation refers to the ability to understand how the innovation could work, specifically if a product needs to be built that did not exist before. Finally, legal knowledge comprises the ability to understand the legality and implications of an innovation. All three types of knowledge are interrelated, yet distinct. While technical knowledge refers to the understanding how to build an innovation it might also lead to an understanding of how much it costs to build it. So the combination of technical and economical knowledge might lead to distinctions such as “impossible to build” or “prohibitively expensive to build with current technologies”.

During the implementation stage of the innovation process and organization needs to build capacity in *knowledge transformation*. One type of knowledge transformation appears in the area of *integration*. It refers to the ability to use existing routines and structures for implementing an innovation. The focus here is primarily internal to an organization. Different departments will need to work together in order to turn a vision for an innovation artefact into reality. A second type of knowledge transformation is in the area of *connection*. An organization needs to have the ability to build, maintain and manage complex relationships beyond its boundaries.

Finally, while operating an innovation, the core capability of an organization lies in *knowledge exploitation*. The first distinct type of knowledge is around *application*. An organization must be in a position to put the innovation to internal use and embed it into organizational routines and structures. Secondly, and organization must build capability in exploiting knowledge around *desorption*, i.e., the ability to externally exploit the monetary and strategic potential of the innovation.

Table 1 summarizes organizational capabilities for innovation.

Ideation	**Incubation**	**Implementation**	**Operation**
Inventive capacity The ability to internally explore knowledge inside the firm. *Acquisition capacity* The ability to identify and obtain knowledge from external sources.	*Economic knowledge* The ability to understand business imperatives and impact related to an innovation. *Technical knowledge* The ability to understand details and inner workings of the innovation *Legal knowledge* The ability to understand details of the legal implication of the innovation.	*Integration* The ability to use existing routines and structures for innovation implementation. *Connection* The ability to build, maintain and manage relationship networks required.	*Application* The ability to put the innovation to internal use and embed it into organizational routines and structures. *Desorption* The ability to externally exploit monetary and strategic potential of implemented innovations.

Table 1: Organizational Capabilities for Innovation

3.3 Process Capabilities

Second, a number of process capabilities are necessary to enable the identification and utilization of knowledge capabilities across the four different stages of innovation. We broadly distinguish between two key properties of process capabilities, *formalization* and *integration*.

Formalization refers to the existence of a structured set of activities in constraint temporal order, rules for their execution and clear responsibilities and accountability at various levels within an organization and beyond. During ideation it is important to have rules, policies and procedures in place that enable an organization and its associated individuals to create, sense, in-source, discuss and manifest new ideas. Subsequently, effective incubation requires formal processes for taking these manifested ideas and evaluate them towards their legal, business or technical feasibility. Importantly, this stage needs to have dedicated processes in place that determine which idea not to take further because of the damage of hanging on to ideas that don't work for too long (Daly et al., 2012). During implementation, processes need to become very rigid because of the economical risk involved in a full-fledged development of a new product or service. They include amongst others development processes with dedicated rules and quality measures, roll-out processes, marketing processes. And finally, during operations an organization needs formal processes around the maintenance of a new

service or product, continued improvement of it, managing expectations of customers as well as escalations and others.

Integration is the second important aspect of process capabilities. There are two distinct sets of integration capabilities, *organizational integration* and *process integration*. Organizational integration refers to rules, policies and procedures that connect the right stakeholders and decision makers at the right time and remove boundaries that arise from departmental silos or organizational boundaries. Process integration refers to rules, policies and procedures that enable a single idea to progress through all the stages of the innovation process, pending the feasibility of the innovation artefact at each stage. Whereas organizational integration in the early stages of the innovation process are very often primarily peer-to-peer, they tend to become more hierarchical at later stages with the increasing business risk of taking decisions regarding new product or service introduction. Similarly, process integration becomes more complex towards the later stages of the innovation process with a larger number of individuals that need to collaborate towards a defined goal. Whereas in the early stages process integration tends to handle the flow of ideas or concepts that evaluate them, in the later stages of the innovation process it is important to orchestrate complex processes between different departments and beyond an organization with many individuals involved.

Table 2 lists the process capabilities for innovation.

Property	**Ideation**	**Incubation**	**Implementation**	**Operation**
Formalization	The specification of the process in terms of documented rules, procedures and policies.			
Integration	The connection of process tasks to relevant organizational structures and authorities (organizational integration) and the connection of a process stage to other stages of the innovation process (process integration).			

Table 2: Process Capabilities for Innovation

3.4 Technology Capabilities

We distinguish between three important technology capabilities relevant to the four stages of innovation, viz. *communication*, *collaboration* and *operation*.

Communication is the least structured technological capability. It enables different organizational individuals as well as individuals that are external to the organization to exchange information. Such information exchange does not necessarily have to be intentionally directed at innovation. During ideation, it is important to have *lateral* (outside-in) communication capabilities. Individuals need to be able to broadly communicate with other stakeholders in their organization as well as customers or suppliers. They also need to be able to consume information from other parts of the business as well as from outside the business efficiently. An organization also needs to build up capabilities for their associated individuals to connect various different threats of communication into a concise larger picture. In the absence of both lateral and outside-in communication capabilities it is unlikely that a large number of innovative ideas will emerge from within an organization. Within the incubation stage, communication capabilities need to be focussed on *horizontal* communication. Various business departments, legal and technical departments need the ability to circulate ideas, evaluate them and keep track of their discussions. During implementation, it is important that an organization builds up *vertical* communication capabilities so that specialist teams can exchange information amongst themselves on how to scale and roll-out a new artefact. Finally, during operations, communication needs to be *bi-directional*. An organization needs to enable associated individuals to listen efficiently to problems of customers as well as to respond effectively to these with a solution.

Collaboration technologies are a second distinct set of technologies that an organization needs to adopt and build capability with. These technologies are usually more structured in that material can be shared with restricted access, different communication patterns are imposed on stakeholders, groups

can be formed to share material or techniques or tools are introduced that aim at certain outcomes such as collaborative decision making (Bjørn & Ngwenyama, 2009). During ideation, collaboration capabilities need to be *lateral*, allowing exchange between the inside and the outside of an organization, as well as *vertical*, between the content creator and a decision authority. During incubation, content exchange between business lines must be *horizontal*. During implementation, work tasks and their outcomes must be integrated across specialist teams, requiring *decomposition* support from collaborative technologies. During operation, content and state *integration* is required between account management and solution providers.

Finally, *operation* refers to the availability of technological capabilities (e.g., platforms) to support and enact operational tasks on each of the innovation stages. Example operational tasks that require technological capabilities include, for instance, task support for collecting ideas (Valacich et al., 1995), for analysing investment returns (Drake et al., 2006), for coordinating work tasks during implementation (Horton & Biolsi, 1993) or for monitoring operational efficiency.

Table 3 details the technological capabilities for innovation.

Property	**Ideation**	**Incubation**	**Implementation**	**Operation**
Communication	*Lateral* Communication between internal and external parties.	*Horizontal* Communication between business lines.	*Vertical* Communication between specialist teams.	*Bi-directional* Communication between innovation provider and consumer.
Collaboration	*Lateral* Inside and outside of organization. o *Vertical* Between knowledge source and decision authority.	*Horizontal* Content exchange between business lines.	*Decomposition* Integration of work tasks and outcomes between specialist teams.	*Integration* Between account management and solution providers.
Operation	Task support for: sensing, collecting, composing, categorizing, filtering, scanning, evaluating.	Task support for: conceptualizing, analysing, negotiating.	Task support for: contracting, coordinating, escalating.	Task support for: monitoring, controlling, optimizing, maintaining.

Table 3: Technology Capabilities for Innovation

3.5 Individual Capabilities

There are a number of individual capabilities that are necessary for successful innovation. We will distinguish between the three different dimensions of *attitude*, *motivation* and *skills*.

Attitude refers to an individual's evaluation of an object of thought (Bohner & Dickel, 2011). In the context of innovation as we conceptualize it in this paper, this translates into an expression of favour or disfavour towards ideating, incubating, implementing or operating an innovation artefact internally or externally. During ideation we can broadly distinguish between "our idea" and "not our idea" and individuals either in favour or disfavour towards generating or in-sourcing ideas. This progresses to "our concept" vs. "not our concept" in incubation. Some individuals will prefer out-sourcing legal, business or technological incubation, while others will prefer the opposite. During implementation we broadly distinguish between "built by us" vs. "bought by us", which again has ample of implications for individuals and their attitude towards either one. And finally, during operations we distinguish between "operate" and "outsource". Again, some individuals will have strong opinions on either one.

Motivation addresses why individuals are involved in innovation projects in the first place. Recent psychological studies have shown that performance-based incentives (external reward such as bonus compensation) can undermine an individual's intrinsic motivation to engage in a task, leading to on-going research into associated reasons (Murayama et al., 2010). On the other hand popular frameworks suggest that individuals need purpose, autonomy and an opportunity to develop mastery

in order to engage effectively in tasks while performing their duties (Pink, 2009), in our case, innovation. Purpose refers to an idea having a larger context, i.e., and idea that makes sense beyond the individual. Autonomy refers to task, team, time and technique. The assertion is that individuals who are in a position to chose these parameters freely are more motivated than the ones that don't have any control over them. Mastery refers to opportunities to get better at what an individual spends energy on accomplishing. During ideation these motifs translate into a yearning to develop ideas that contribute to something larger, the freedom to do so at an individual's discretion, and a structured process that helps them to get better at developing ideas that matter and have a chance to impact in positive ways. The other three stages are similar, but each referring to the innovation artefact generated during incubation, implementation and operation.

Skills are the last dimension of individual capabilities that we distinguish. There are many skills that cut across all stages of innovation, hence we are limited to name a few that stand out at each stage. During ideation, individuals need the ability of divergent thinking. They also need to be creative and / or able to sense within their environment. During incubation divergent thinking turns into convergent thinking. Legal, business and technical skills enable the creation of artefacts during this stage. During implementation, individuals will need to have skills in marketing products or services, rolling them out, scaling them and developing them. And finally, during operations individuals will need maintenance skills as well as skills in managing service level agreements and contractors.

Table 4 summarizes relevant individual capabilities for innovation.

Property	**Ideation**	**Incubation**	**Implementation**	**Operation**
Attitude	*our idea* vs. *not our idea* The degree of comfort with developing ideas. The degree of comfort with in-sourcing ideas.	*our concept* vs. *not our concept* The degree of comfort with developing architecture, business model and business case. The degree of comfort with applying what works elsewhere.	*built by us* vs. *bought by us* The degree of comfort with implementing a new service, process or product. The degree of comfort with buying a new product, service or process.	*operate* vs. *outsource* The degree of comfort with operating a new service, product or process. The degree of comfort with selling a new product, service or process.
Motivation	*Purpose* The yearning to develop ideas that contribute to something larger. *Autonomy* The urge to identify our own ideas. *Mastery* The desire to improve in generating innovation ideas that matter.	*Purpose* The yearning to design concepts that maximize the value of a larger idea. *Autonomy* The urge to develop our own concepts. *Mastery* The desire to improve in developing innovation concepts that provide value.	*Purpose* The yearning to contribute to the building of a larger innovation. *Autonomy* The urge to build our own innovations. *Mastery* The desire to improve in developing innovations that work.	*Purpose* The yearning to contribute to the service of a larger initiative. *Autonomy* The urge to execute our own innovations. *Mastery* The desire to improve in making the most from an innovation.
Selected Skills	Creativity Divergent thinking	Business sense Architecture	Development Marketing	Operations Maintenance

Table 4: Individual Capabilities for Innovation

4 EMERGING PROPOSITIONS

We have provided a multi-level model of capabilities required in an organizational innovation process. Our model builds on the capability-oriented view of the firm and proposes a set of novel propositions about how organizations can establish an innovation culture by creating the necessary capabilities.

First, our model suggests that organizational innovation is a multi-level process that is dependent on the availability and enactment of specific organizational capabilities of the firm. These capabilities manifest specifically in the absorption, assimilation, transformation and exploitation of knowledge, both from within and from outside the firm. As we have argued above, organizational capabilities are related to the question as to why innovation occurs in organizations. We assert that it is a reasonable assumption that we can explain a stronger innovation culture as measured by successful innovation initiatives if we can answer *why* organizations innovate. Formally, we state:

P1. Organizations are more innovative as measured by the number of successful innovation initiatives – initiatives that traversed the innovation process of ideation, incubation, implementation and operation – if they possess appropriate organization capabilities.

Second, our model recognizes the role of individual stakeholders in the innovation process. We assert that individual capabilities moderate the effect of organizational capabilities on the innovation process and hence the innovation culture of an organization. As a result, individual capabilities together with organizational capabilities explain are the two main explaining factors for successfully traversing innovation processes. In the presence of appropriate individual skills in innovation agents, existing organizational capabilities are amplified to strengthen the innovation culture. Conversely, the absence of appropriate individual skills in innovation agents will leave existing organizational capabilities untapped and contribute to weakening the innovation culture. We state:

P2. Appropriate individual capabilities moderate the effect of organizational capabilities on innovation culture.

We continue to propose that organizational capabilities are enabled through process capabilities. Process capabilities, as we have argued above, pertain to the boundary conditions of innovation in organizations. The absence of appropriate process skills will lead to insufficient organizational skills, in turn voiding individual innovation capabilities and leading to a lower number of successful innovation initiatives. Formally, we state:

P3. The enactment and presence of appropriate organizational capabilities to innovate requires the presence of appropriate process capabilities.

Aside from process capabilities, our model suggests that the organizational capabilities are supported through appropriate technology capabilities. These capabilities refer to how innovation is supported in organizations. We state:

P4. Technology capabilities support the enactment of organizational capabilities.

Not only do technology capabilities support organizational capabilities. They also implement process capabilities. As such, they have a dual effect on the innovation process as explained by our model. We also believe that technology capabilities have an effect on individual capabilities, but will not cover this relationship in our model as it is covered extensively elsewhere. Formally, we state:

P5. Technology capabilities enable the implementation of process capabilities.

Finally, our model asserts that there is a reciprocal relationship between technology and process capabilities. Process capabilities also enact technology capabilities in that they specify how technology is implemented and used within an organization. We state:

P6. Technology capabilities are enacted through process capabilities.

5 CONCLUSIONS

This papers reports on our research efforts to develop a novel multi-level conceptualization of the organizational innovation process. Our model considers organizational, process, technology and individual capabilities required to execute different stages of the organizational innovation process, and positions these factors in a conceptual model outlining the relationships between the factors in enabling the organizational ability to innovate.

Without empirical validation, our theory must be considered tentative in nature. Obvious limitations relate to the lack of empirical examination and thus the speculative nature of the model and its key propositions. However, our efforts focused on theory building rather than testing, and our model is grounded in a robust theoretical frame, the resource-based view of the firm (Wade & Hulland, 2004), and our arguments are based on a comprehensive review of the literature and our own experiences in dealing with organizations attempting to innovate.

Our theory can guide future research in several ways. First, future studies should look to establish operational construct definitions that will allow for an empirical validation of the process logic contained in our model, in order to examine validity and explanatory power of our model. Second, further exploratory research (e.g., by means of qualitative case studies) can peruse our framework as a theoretical lens to examine existing cases of successful and failed innovation efforts of organizations. For example, in our own future work, we will use the lens to re-examining published cases of innovations, both failure (e.g., Lucas Jr. & Goh, 2009) and success cases (e.g., Barrett et al., 2012). In conducting these studies, strategies for developing process theory will be helpful in identifying relevant data items and levels of analysis (Langley, 1999; Pentland, 1999). These efforts will allow us to examine internal, external and in conclusion the validity of our suggested conceptualization.

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